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# The Development of Innovative Online Problem-Based Learning: A Leadership Course for Leaders in European Public Health

## Abstract

The shift to a knowledge information society has given rise to a need for lifelong learning programmes. Such programmes are especially relevant for public health professionals, whose dynamic field of practice is subject to changes due to rapidly developing technologies, evolving expectations of the labour market and new health treats. Lifelong learning programmes for public health should address topics like planning, organisation, leadership, teamwork and research methods, and schools of public health should introduce innovative educational approaches that enable professionals to learn from the experiences of others.

This paper describes the rationale for the development of a European online problem-based course on leadership for public health professionals in Europe, the first pilot evaluation and its impact on the final shape of the course.

Problem-based learning (PBL) is an excellent approach for a course focused on lifelong learning, because it stimulates constructive, collaborative, and self-directed learning from authentic problems that are relevant to professional practice, and thereby facilitates the transfer of knowledge. Blended learning, which combines face-to-face and online learning, provides new opportunities for working professionals, enabling participation in international student teams and attendance of lectures by international experts without the need to travel. This makes blended problem-based learning a highly effective and efficient learning strategy for continuing professional development.

The paper presents a structure for an online pilot leadership course underpinned by a review of the literature and developed and implemented by an international collaboration of four European universities. The curriculum consisted of eight sessions. Each session was developed and offered by a different university center. Two first sessions were delivered face-to-face and the other sessions were online. The seven-step approach of Maastricht University was suitable for a blended mode of PBL. Twelve public health professionals for NHS took part in the course and final evaluation. They found it difficult to use online communication tools for learning and professional activities. Based on the results of the pilot the leadership course was adapted. The training at the beginning was extended with information on behaviour during online sessions. Online practice sessions were integrated before the course. The problems were reformulated and build around a common theme.

Educational institutions who would like to embark on a similar project, should consider complexities related to coordination, development and implementation of such a complex educational practice.

## Keywords

Online Learning, Synchronous Communication, Problem-Based Learning (PBL), European Public Health and Leadership

## Cover Page Footnote

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## Introduction

Society has changed dramatically since the arrival of the computer, and the shift to a knowledge and information society has a major impact in many areas including education (Rubens 2003). Due to rapid changes in technology and the arrival of the Internet, knowledge and the transmission of knowledge have undergone profound changes (Pépin 2007). As a consequence, lifelong learning has become an important objective in education, and since the mid-1990s it has been the central strategy in education and training policies in the European Union (Dehmel 2006). In today's world it is unthinkable that in primary, secondary and higher education young people are able to gather sufficient knowledge to last them a lifetime and enable them to pursue a successful professional career. Employees and professionals in all fields are confronted with an incessant stream of new developments and findings, and to incorporate these into their working lives and ensure they perform optimally, they need to be lifelong learners who can keep up to date with innovations (Borg & Mayo 2005).

To effectively operate in the 21st century, professionals must possess appropriate skills and competencies, including those for lifelong learning (Van Merriënboer et al. 2009). This is especially relevant for health-care professionals in public health, as this is a highly dynamic field that faces many new technology developments, evolving expectations in the labour market and new health threats (Czabanowska, Mikeska, & Brand 2011). Since health-care professionals operate as multi-professional teams with roles and responsibilities that are increasingly blurring, it is essential to provide adequate lifelong learning opportunities that allow for collaborative learning. In 2009, the supply of and demand for lifelong learning in public health were investigated in all member schools of the Association of Schools of Public Health for the European Region (ASPHER) or the European Public Health Association (EUPHA) (Mikeska 2009). A multitude of courses were reported that were labelled as lifelong-learning courses, but in fact were part of the universities' regular bachelor and master programs. Most courses were on traditional public-health topics such as epidemiology and biostatistics, or health management; however, today's experienced public-health workforce demands new and innovative knowledge. The study thus revealed a mismatch: there was an unfilled need for education on leadership, planning, organisation, teamwork and research methods (Mikeska 2009).

Leadership is still not common in most public-health training programs at either undergraduate, postgraduate or continuous professional development (CPD) levels (Czabanowska et al. 2013; Bjegovic-Mikanovic et al. 2012).

Mikeska's (2009) found that schools preferred an educational method that combined active participation in courses (as in problem-based learning), discussions and project-based learning. From the findings of this pilot study, Mikeska concluded that schools should introduce innovative educational approaches by which health professionals could learn from others' experiences. This was the starting point of the development of a leadership course for leaders in European public health that combined problem-based learning (PBL) and online learning. To develop such a course, Maastricht University (the Netherlands), in cooperation with the Sheffield Hallam University (England), Kaunas University of Medicine (Lithuania), Medical University of Graz (Austria) and ASPHER, initiated the European Erasmus Multilateral Curriculum Development project "Leaders for European Public Health" (LEPHIE).

This article describes the educational rationale for the development of the public-health leadership course, the evaluation of the first pilot of the newly developed course and the pilot's impact on the final shape of the course.

## **Educational Rationale**

### ***Educational Method: Problem-Based Learning (PBL)***

PBL is a well-described and established educational method based on modern insights into human learning. In PBL, learners are viewed as active participants in the sense that they activate their prior knowledge and construct knowledge by integrating new information into what they already know. Learners are expected to engage in a constructive process of knowledge-building (Dolmans & Schmidt 2010). Indeed, constructive learning is one of the four key learning principles of PBL (Dolmans et al. 2005). Mikeska (2009) found that participation in discussions was a highly rated aspect of courses for lifelong learning; these results support the importance of collaborative learning, another key principle in PBL. Collaboration is a social structure in which two or more participants are interacting, and these interactions can have a positive effect on the learning of all course participants (Dolmans et al. 2005).

Many studies have reported PBL's positive effects, such as high satisfaction among students and teachers and positive results from group learning (Dolmans & Schmidt 2010). Self-regulation is another key principle in PBL (Dolmans & Schmidt 2010): participants play an active role in planning, monitoring and evaluating their own learning process, with reflection playing a prominent role. : "Self-directed or lifelong learners plan, monitor and evaluate their own learning and direct or regulate their own learning process" (Dolmans et al. 2005 p. 733). Being able to direct one's own learning process is a key competency for self-directed learners, which is especially relevant in a field like public health, where professionals must continually cope with rapid and dynamic developments. The fourth key learning principle of PBL is contextual learning, in which, ideally, learners are exposed to problems relevant to their work as professionals, because this stimulates the transfer of knowledge (Dolmans et al. 2005). Contextual learning can be implemented in a course for public-health professionals by inviting participants to contribute with authentic cases from their day-to-day practice and by stimulating them to analyse these cases collaboratively and from multiple perspectives.

The PBL approach has frequently been translated to curricula and courses. Maastricht University has distinguished itself both nationally and internationally for its research on PBL and its consistent implementation in undergraduate programs: students generally work on tasks in small groups. The tasks are usually presented in the form of problems, which are addressed in a process consisting of seven steps, which are grouped into three phases – preliminary discussion, self-study and reporting – and worked through in a fixed order. The steps in the preliminary discussion stage are: clarifying concepts; defining the key problem of the task; analysing the problem/brainstorming; problem analysis/systematic classification; and formulating learning objectives. Explanations for and opportunities to define the problem using prior knowledge within the group are provided, and an inventory is made of gaps in the group's knowledge that need to be filled to address the problem. The second phase, which contains only the self-study step, involves individual work between group sessions: students study the literature and other sources of information to find answers to the questions that remained unanswered in the preliminary discussion. In the last phase, which contains only the discussion step, students present their newly acquired knowledge and information to the group, and these findings are synthesised during the group discussion (Van Til & Van der Heijden 2009).

PBL groups consist of a discussion leader (a task that rotates among the participating students), between nine and 11 group members (including a minutes secretary) and a tutor (a lecturer or a senior student). The discussion leader ensures that the group adheres to the correct process during the discussion. During group sessions, participants exchange ideas, thoughts and views pertaining to the task at hand. The minutes secretary writes notes that are visible to all participants on a whiteboard or similar. The tutor supports the learning and collaborative process within the tutorial group (Van Til & Van der Heijden 2009).

### ***Blended Learning, a Variant of Online Learning***

The use of the Internet (or a local intranet) in an educational setting can be described as online or web-based learning (Goodrich 2007), but many other terms are used interchangeably, such as virtual learning, cyber-learning and e-learning (Staker & Horn 2012). In a recent paper, Staker and Horn (2012) defined online learning as an educational format in which content and instruction are delivered primarily over the internet. Blended learning is seen as a mix of different instructional modalities; for example: traditional and online education; tools and media combined in an e-learning environment; or a combination of didactic strategies. Today, the term “blended learning” is widely, but not always consistently, used in (continuing) education at universities and elsewhere (Oliver & Trigwell 2005). In this article blended learning is defined as a combination of online and face-to-face learning. Online learning could help overcome barriers of time and distance (Turney et al. 2009), which is crucial for a course in which participants and teachers are spread across Europe, while face-to-face meetings would promote collaboration between participants and between participants and teachers, and help develop a sense of solidarity (De Jong 2012). The majority of higher-education institutions use a virtual learning environment (VLE), which is highly suitable for blended learning. VLEs enable the exchange of course materials, such as module books, literature and videos, and most have integrated communication tools for online synchronous and asynchronous communication. Participants who want to join a blended learning program need access to a computer with a stable internet connection, and a headset and webcam are essential.

A numerous advantages of online PBL have been reported, including facilitating learning on a global scale to promote the acquisition of knowledge and communication between students at dispersed locations (Suzuki et al. 2007). Possible disadvantages can be mentioned, such as social isolation and technical problems. These disadvantages can be anticipated by a good introduction and preparation. De Jong (2012, p. 130) concluded that “PBL as an education method for blended learning is possible”. Because experiences at Maastricht University have shown that the seven-step approach and tutorial groups are suitable for a blended mode of PBL (De Jong & Verstegen, 2009), this approach was used in all online sessions.

### ***Initial Course Design***

Applying the principles of both PBL and blended learning, a public-health leadership course was developed based on the review of Smith et al. (2013), which aimed to identify themes and conceptual models of public-health leadership as well as factors associated with more effective public-health practice. The curriculum consisted of eight sessions: leadership theories; systems thinking; political leadership; inspiring and motivating others; building and leading interdisciplinary teams; leadership and communication; leadership, organisational learning and development; leading change; and alternative discourses and leadership. The course lasted eight weeks, with each session developed by a different university center. The first two sessions were delivered face-to-face; the others were online. Not all students and teachers were familiar with

PBL. However, all were prepared for their roles at the beginning of the course in two face-to-face meetings. The designer of the task facilitated the particular group session. They were scheduled weekly on a fixed day, which met the participating professionals' need for frequent activities and ample time for preparation. A fixed schedule also made it easier for the participants to obtain time off from work than an irregular schedule. As in the Maastricht PBL system, in which lectures are given between tutorial group sessions, the blended group sessions were supported by (interactive) lectures. Assessment took place at the end of the course and consisted of a face-to-face presentation and a paper. Table 1 presents an overview of the time devoted to online and face-to-face activities during the blended PBL course.

Table 1. Overview of the Time Spent on Face-to-face and Online Activities in the Course

Activities	Hours in course
3 F2F meetings (2 x 8 hours and 1 x 4 hours)	20
8 online meetings (8 x 2 hours)	16
8 lectures (8 x 1 hour)	8
Self-study hours	124
<b>Total hours</b>	<b>168</b>

The VLE of the coordinating university was used for all online activities. Study materials (e.g., literature) for the PBL tasks were organised by session. Discussion boards were operated as asynchronous question forums.

## Pilot of the Leadership Course in Sheffield

### *Design*

Piloting of the leadership course assumed a design of an evaluative case study: "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (Stake 1995, p. xi).

### *Participants and Ethical Considerations*

Sheffield Hallam University was responsible for the organisation of the course, and recruited students through the university's regular marketing system. Twelve public-health professionals working for NHS took part in the course and final evaluation. The participants were assured of the anonymity of their responses to the evaluation, and they signed the informed-consent form.

### *Data Collection and Analysis*

Evaluation data were collected using three instruments: an open-ended questionnaire, a semi-structured questionnaire and a focus-group interview. The open-ended questions were related to the module and participants' previous experiences with blended learning. After the course students completed a questionnaire to evaluate the individual sessions using a Likert scale from poor (1) to good (6). The sessions were evaluated with respect to academic content, potential improvement of

skills, improvement of knowledge, enjoyment, access to recommended reading, depth of work and overall content of the session. An external expert moderated the focus-group interview after the module. Questions were built around the following topics: the course, the effectiveness of blended learning in general, the use of Elluminate, contact with teacher(s) and internationality.

The data from the open questions were analysed using content analysis (Hsieh & Shannon 2005). The focus-group interview was video-recorded and transcribed verbatim. The text was also analysed using content analysis.

## **Results**

### ***Blended Learning***

Students did not have previous experience with blended learning. The initial face-to-face meeting was extremely useful in giving students the chance to get to know each other, thus giving them confidence in further contacts. The students stated that more time should be spent on initial training: how to act/behave/work during online sessions and how to use the technology. They believed that it would be useful to practice more in their real home or office settings. Blended learning was much more challenging and intimidating than they had expected. Although they already knew how to use Skype and online communication tools, they found it difficult to use them for learning and professional activities. Seeing the faces on the screen using webcams, but not having an immediate emotional feedback (nodding, smiling, etc.) from other participants and the trainer/tutor made them feel uncomfortable and isolated. Students found e-lectures very convenient. They appreciated the possibility of interaction with the lecturer. Students reported that listening to lectures recorded earlier made it more difficult to stay focused and suggested that lectures be shorter. Students experienced working in smaller groups to be effective. They suggested that more breaks are needed during sessions, as it was difficult to concentrate during the entire session. Although the technology was challenging, they said that “leaders should take challenges”.

### ***Content of the Leadership Course***

The students became more aware of leadership challenges in public health. They found the most useful sessions to be systems thinking, political leadership and alternative discourses and leadership. However, students found all sessions useful, despite low scores for the session on inspiring and motivating others, as students considered that it was too concerned with course assessment. The session on building and leading interdisciplinary teams was considered to be too focused on clinical teams. Students suggested integrating a main topic throughout the entire module. Each of the sessions helped the students gain experience as leaders in a context linked to the type of work each did professionally.

### **Impact of the Pilot on the Leadership Course**

The leadership course was refined based on the results of the pilot. The training on PBL and blended learning at the beginning of the course was extended to include information on behaviour during online sessions. Moreover, online practice sessions were integrated before the start of the course. No other adjustments to the educational aspects were made.

Students scored the session on inspiring and motivating others low; it was therefore omitted. A session on emotional intelligence and leadership in team-based organisations was added. The content of other sessions was not changed but the titles of some sessions were adapted. It resulted in the following eight sessions: (1) what is leadership?; (2) system thinking; (3) political leadership; (4) building and leading interdisciplinary teams; (5) leadership and communication; (6) leading change; (7) emotional intelligence and leadership in team-based organisations; (8) and leadership, organisational learning and development. The discussion problems, which constitute an integral part of each session, were reformulated and built around a common theme of chronic disease and ageing; this theme was selected because it constitutes an important priority in public health, with links to all topics and sessions.

## **Discussion and Conclusion**

The LEPHIE project was undertaken to meet the need emerging from a Europe-wide study among schools of public health to introduce innovative approaches to promote lifelong learning and help professionals learn from others' experiences (Mikeska 2009) while studying in collaborative teams in an online learning environment. During the development of the European leadership course for public health, the PBL approach and the blended-learning format were considered to have characteristics that made them highly suitable to meet the project's objectives. This suggested the possibility of a European leadership course in public health offered in a PBL blended-learning format: quite an innovative notion, but one that seemed worthwhile because of the numerous advantages it offered. Online PBL enables communication between participants anywhere and facilitates learning on a global scale, thereby promoting understanding of the different social and cultural traditions in other countries. It also facilitates multidisciplinary and inter-professional learning, which helps to nurture a spirit of teamwork and an understanding of the roles of other professionals (Suzuki et al. 2007). An earlier study we conducted showed that contributions from experts in online sessions were feasible, and that students greatly appreciated them (De Jong 2012), and that they could enhance the level of education.

In the literature there has been a considerable amount of criticism of online learning. Particularly where principles of effective learning were not incorporated into the initial design of online learning programs, social isolation and technical problems were found, which were deemed to be considerable drawbacks of this method (Cook 2007). These potential problems should be taken into account when deciding on the use of online learning. As Mayer (2009) reported, the availability of online tools in itself is not a good enough reason to use them and careful consideration must be given to the knowledge of how people learn and how they react to online learning tools (Mayer 2009). In developing the leadership course for public health, the LEPHIE project therefore looked thoroughly at the benefits and drawbacks of the proposed approach of blended PBL, drawing on recent experiences at Maastricht University, where during the past five years online and blended learning solutions for PBL in the bachelor and master programs have been actively explored (Könings et al. 2013).

Educational institutions that would like to embark on a similar project should consider the complexity related to the coordination, development and implementation of such a complex educational practice, which requires integration of new technology, developing up-to-date content, combining different institutional cultures and taking into account students' evolving interests and system contexts.



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